

To Prospective Authors

Postal Service seems to have deteriorated in many other countries as well as in the United States of America. Since we will absolutely not publish a paper unless the galley proofs have been corrected and returned by the authors, the slow surface mail service (a minimum of 6 weeks from European countries, 8 to 12 weeks from India and Africa) may make a delay in publication inevitable. We strongly urge that authors who have submitted papers to the Veliger make all necessary arrangements for expeditious reading of the proofs when received (we mail all proofs by air mail) and their prompt return by air mail also.

Since we conscientiously reply to all letters we actually receive, and since we experience a constant loss in insured and registered mail pieces, we have come to the conclusion that if a correspondent does not receive an answer from us, this is due to the loss of either the inquiry or the reply. We have adopted the habit of repeating our inquiries if we do not receive a reply within a reasonable time, that is 6 weeks longer than fairly normal postal service might be expected to accomplish the routine work. But we can not reply if we have never received the inquiry.

Because of some distressing experiences with the Postal Service in recent years, we now urge authors who wish to submit manuscripts to our journal to mail them as insured parcels, with insurance high enough to cover the complete replacement costs. Authors must be prepared to document these costs. If the replacement costs exceed \$200.-, the manuscript should be sent by registered mail with additional insurance coverage (the maximum limit of insurance on parcel post is, at present, \$200.-). We are unable to advise prospective authors in foreign countries and would urge them to make the necessary inquiries at their local post offices.

We wish to remind prospective authors that we have announced some time ago that we will not acknowledge the receipt of a manuscript unless a self-addressed stamped envelope is enclosed (two International Postal Reply Coupons are required from addresses outside the U. S. A.). If correspondence is needed pertaining to a manuscript, we must expect prompt replies. If a manuscript is withdrawn by the author, sufficient postage for return by certified mail within the U. S. A. and by registered mail to other countries must be provided. We regret that we must insist on these conditions; however, the exorbitant increases in postal charges leave us no other choice.

We are willing to accept requests for expediting our journal via AIR MAIL; however, in that case we must ask for an additional payment of US\$8.00 in all cases where the Veliger goes to domestic addresses, and a deposit of US\$18.00 for all foreign addresses (including PUAS).

METHODS & TECHNIQUES

Artifacts Incurred by the Treatment of Acmaeid Radulae with Alkalies

BY

DAVID R. LINDBERG

Department of Invertebrate Zoology
California Academy of Sciences
San Francisco, California 94118

(1 Text figure)

THE TREATMENT OF RADULAE with alkalies to remove associated tissue or teeth has been described in a number of publications, including: ABBOTT (1954), FRITCHMAN (1960b), GRANT (1937), KNUDSEN (1966), RADWIN (1969), and TURNER (1960). All the techniques are quite similar in methods and materials. The alkali generally used is sodium hydroxide (NaOH) or potassium hydroxide (KOH) and the radula is treated in either a cold or hot solution, the latter being more commonly used.

Reference to artifacts produced by the use of caustic alkalies on chitinous structures was made as early as 1851 by LEUCKART and more recently by RISSO-DOMINGUEZ (1961). The basic problems are: 1) the varying degrees of shrinkage of the radular ribbons and 2) the dissociation of the teeth from the radular ribbon.

In the course of preparing acmaeid radulae, the author used standard techniques as described by the aforementioned authors. As illustrated in Figures 1a and 1b, the resulting radular ribbons of *Collisella scabra* (Gould,

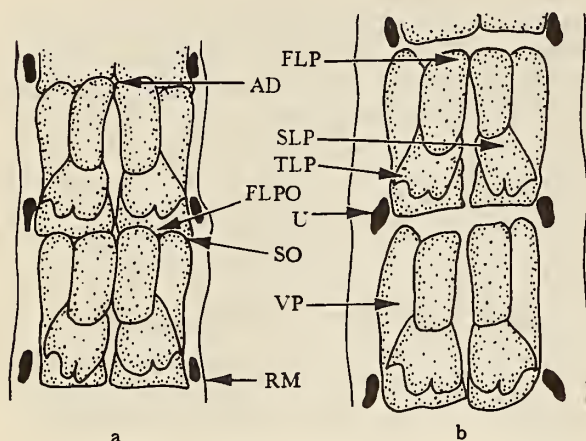


Figure 1

a) Segment of radular ribbon of *Collisella scabra* (Gould, 1846) prepared with "hot" potassium hydroxide (KOH). Artifacts illustrated: Anterior Divergence = AD; First Lateral Plate Overlap = FLPO; Spatulum Overlap = SO; Ribbon Margin = RM. Width of ribbon approximately 0.25 mm

b) Adjacent segment of radular ribbon prepared with "cold" KOH. General structures of radular ribbon illustrated: First Lateral Plate = FLP; Second Lateral Plate = SLP; Third Lateral Plate = TLP; Uncinus = U; Ventral Plate = VP

1846) show significant differences. Figure 1a illustrates a section of radula treated with hot KOH as per FRITCHMAN (1960b) and Figure 1b illustrates an adjacent section of the same radula treated with cold KOH. The shrinkage in Figure 1a is evidenced by the crowding of the basal plates and the wavy radula margin from the contraction of the ribbon. Figure 1b shows little or no shrinkage with the basal plates being equally spaced and uncrowded.

In acmaeid radular work the implications of these artifacts are quite important. GRANT (1937) demonstrated the species-specific characters of the acmaeid radula and proposed identification techniques based on the radula. FRITCHMAN (1960a) further defined characters and recognized *Acmaea paradigitalis* Fritchman, 1960 [= *Collisella strigatella* (Carpenter, 1864)] by its radular characteristics. More recently, McLEAN (1966). MOSKALEV (1970), GOLIKOV & KUSSAKIN (1972) and CHRISTIAENS (1975) have used radular characters to determine species, subgenera, and genera.

It is imperative that characters that may be altered by shrinkage [*i. e.*, degree of overlap of various plates or

divergences created by overlaps (Figure 1a)] be used with caution in taxonomic works. Instead, characters such as lateral plate shapes and tooth shapes (*cf.* McLEAN, 1966: 30) should be given more weight as they appear unaltered by shrinkage of the ribbon.

Currently, the use of warm KOH (not boiling) is preferred by the author for the removal of tissue and teeth as the results are more consistent and predictable. The cold KOH technique has been found to yield poor results, the greatest difficulty being in judging the correct immersion time in KOH. Too long an immersion separates the lateral plates from the ventral plates and too short an immersion time will not separate the teeth from the lateral plates.

A new technique, using alkylene polyamines to isolate the radula has been presented by RISSO-DOMINGUEZ (1961) and may provide for the elimination of the technique artifacts in radular preparation caused by methods using alkalis.

This work was made possible by Sea Grant #R/CZ-28.

Literature Cited

- ABBOTT, ROBERT TUCKER
1954. American seashells. Princeton, New Jersey. D. van Nostrand Co., Inc.; xiv+541 pp.; 40 pls.; 100 text figs.
- CHRISTIAENS, J.
1975. Revision provisoire des mollusques marins récents de la famille des Acmaeidae et description de deux nouveaux sous-genres: *Simplacmaea* nov. subgen. et *Collisellaacmaea* nov. subgen. Inform. Soc. belge Malacol. (4) 1: 3-18; 2 pls. (15 February 1975)
- FRITCHMAN, HARRY KIER, II
1960a. *Acmaea paradigitalis* sp. nov. (Acmaeidae, Gastropoda). The Veliger 2 (3): 53-57; pls. 9-12 (1 January 1960)
1960b. Preparation of radulae. The Veliger 3 (2): 52-53 (1 October 1960)
- GOLIKOV, ALEXANDER & OLEG G. KUSSAKIN
1972. Sur la biologie de la reproduction des Patelles de la famille Tecturidae (Gastropoda: Docoglossa) et sur la position systématique de ses subdivisions. Malacologia 11 (2): 287-294; 7 text figs.
- GRANT, AVERY RANSOME
1937. A systematic revision of the genus *Acmaea* Eschscholtz, including considerations of ecology and speciation. Ph. D. thesis, Zoology, Univ. Calif. Berkeley, iii+432 pp.; pls. 1-35
- KNUDSEN, JENS W.
1966. Biological techniques. Harper and Row, New York: xi+525 pp.; illust.
- LEUCKART, RUDOLF
1851. Der Bau der Insekten in seinen Beziehungen zu den Leistungen und Lebensverhältnissen dieser Thiere. Arch. Naturgesch. 17: 1-25
- McLEAN, JAMES HAMILTON
1966. West American prosobranch Gastropoda: superfamilies Patellacea, Pleurotomariacea, and Fissurellacea. i-x+255 pp.; pls. 1-7 (Ph. D. thesis, Stanford Univ. June 1966)
- MOSKALEV, L. I.
1970. Gastropod molluscs of the genus *Collisella* (Prosobranchia: Acmaeidae) of the fringing Asian seas of the Pacific Ocean. Trudy Inst. Okeanol. 88: 174-212; 15 figs.; 24 pls.; 6 tables
- RADWIN, GEORGE EDWARD
1969. Technique for extraction and mounting of gastropod radulae. The Veliger 12 (1): 143-144 (1 July 1969)
- RISSO-DOMINGUEZ, CARLOS J.
1961. The use of alkylene polyamines to isolate radulae. I. Relations between effectiveness and chemical structure. Stain Techn. 36 (3): 151-157; 1 table (May 1961)
- TURNER, RUTH DIXON
1950. Mounting minute radulae. The Nautilus 73 (4): 136-137